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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/824,624

04/14/2004

T. Douglas Mast

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EXAMINER

JAWORSKI, FRANCIS J

ART UNIT

PAPER NUMBER

3768

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/824,624

Applicant(s)

MAST ET AL.

Examiner

Jaworski Francis J.

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3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 8/2/04 (IDS).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 - 24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/2/04
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 – 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term “artifact(s)” in relation to ultrasound imaging may pertain to contamination or imperfect or erroneous performance based on the transducer or ultrasound signal or ultrasound system component behaviour however it may also pertain to unwanted image components arising from anatomic tissue, Lathbury et al (US6142940) col. 5 lines 8 – 14 as an example of an attempt to eliminate blood speckle artifact, or Forestieri et al (US5299174) as an example of an attempt to remove tissue flash or ‘wall bleed’ artifact from a bloodflow image. Hence ‘artifact’ as a term in the ultrasound imaging context is non-specific and generic to artifact arising in either the ultrasound equipment or in the effect of tissue or blood apart from the performance of the equipment. An additional aspect of this ambiguity in relation to the ultrasound imaging art is that often a mask image frame is subtracted from an image to remove a component which may be characterized as unwanted and therefore artifact in relation to that for which an image is desired, see Ishihara et al (US5241473) Fig. 1 and attendant discussion or Teo (US5876343) Fig. 4 and col. 7 lines 57 – 59. The term ‘calibration’ however arises solely in relation to the initializations/re-initialization or standardization practiced in relation to measuring equipment including biomedical equipment or

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ultrasound imaging equipment. Therefore reasonable artisans would differ as to whether the scope of claim 1 is limited to compensatory processes for purposes of remedying performance variations in the ultrasound measurement *equipment* (such as the ringdown or main bang (represented by claim 6) or coupling layer reflection artifacts (represented in claim 7) detailed in applicants' paras [0005] – [0006], or, if for the terms 'calibration signals' is substituted the broadest reasonable equivalent terms 'standardizing or reference signals', for purposes of also providing remedy for image contaminating behaviour of the *anatomy* such as organ or vessel wall motion or blood speckle. That is, that the claim wording is generic to artifact arising from any source in relation to the imaging.

For purposes of examination based upon prior art the Examiner is resolving this ambiguity in favor of the broader interpretation, and the O'Donnell et al (US5453575) - based rejection below is therefore predatory upon that broad interpretation.

[ The latter patent is also related to the Wu et al patent which serves as the core rejection basis below as the tissue/blood processing side versus the ringdown artifact correction side, see Wu et al col. 6 lines 9 – 15, and also below.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 3, 5, 8, 11-18, 20 - 24 are rejected under 35 U.S.C. 102(b) as being anticipated by O'Donnell et al (US5453575) which teaches that the image contaminant effect of tissue and blood visualization on each other by receiving and subtracting one or more image sample sets M (col. 22 lines 4 – 37) to provide a standardization for selective emphasis of blood or slow moving or stationary tissue, each of the standardizing sets or the plural sets being characterizable as 'at least two calibration signals' either in the sense of pixels within a frame or in the sense of plural frames, and which are subtracted to derive a contaminant-free signal which is then imaged, M being an averaging index which when greater than two serves as an iteration or update index, the balanced sine cosine taper amplitude modulation described in col. 25 lines 11 – 33 providing a weighting thereto, the resulting image being displayed as the imaging catheter is moved with respect to the surrounding lesion. Zero values may be set initially into the Wallace adder by the operator or result when a new measurement is begun. Claim 20 appears to be a duplicate to step d) of claim 1 however assuming that the latter pertains to displaying an image of the correction per se as per claim 23, O'Donnell et al pertains to compositing based upon both the tissue (calibration correction basis for bloodflow) and the corrected or bloodflow image.

Claims 1 – 9, 11 - 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu et al (US6036650).

Wu et al is directed to an enhanced ringdown and main bang and probe surface saturation corona elimination scheme where calibration frame data subtraction is performed as a weighted average across multiple frames with weighting adapted in an

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alternative method to account for greater offset for motion location change or other source of decorrelation or drift such as temperature and with initial and operator set zeroing via weight contribution and threshold levels, see cols. 6 and 7 and col. 2 lines 7 – 8.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell et al as argued above, further in view of Phillips et al (US6632177).

Whereas the former as applied above is silent as to weighting assigned in accordance with movement and correlation changes, it would have been obvious in view of the

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latter element 18 and col. 9 lines 4 – 41 to use motion/correlation changes as a basis for difference imaging so as to emphasize bloodflow in images, particularly where contrast agent is additionally used.

Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al as applied to claims 1 or 9 above, and further in view of Hassler (US5245586), since whereas the former is silent as to compensation for intervening structure except for the recognition of the transducer boundary surface as bounding the ringdown, it would have been obvious in view of the latter's inventive summary to consider both the transducer – tissue transition materials or mismatch characteristics of intervening tissues as a source of artifact to be compensated for by offsetting compensation whereupon it would have been inherently obvious to consider respiratory tissue and motion thereof as such an artifact source.

Eberle et al (US5,183,048) and Barlow et al (US5601082) are cited as of interest for their characterization as predecessor techniques in Wu et al Col. 1 bottom and col. 2 lines 22 – 27. Ryan et al (US5993393) is directed to an off- resonance subtraction technique per col. 4 lines 27 – 51.

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

6-18-06

  
Francis Jaworski

Primary Examiner

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